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EXAMINER
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VARGOT, MATHIEU D

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/628,181  
Filing Date: July 25, 2003  
Appellant(s): SHIH ET AL.

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Ann M. Agosti  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed January 10, 2008 appealing from the Office action mailed August 22, 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

Appellant has stated that there are no outstanding amendments to be considered and such is agreed with. However, it should be noted that a request for reconsideration was filed on October 19, 2007 (ie, after final) and such was considered but not found persuasive.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

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**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,877,717	SUZUKI et al	10-1989
3,809,732	CHANDROSS et al	05-1974
6,828,078	NISHIMURA et al	12-2004

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1-8, 10, 11 and 13-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over either of Suzuki et al or Chandross et al in view of Nishimura et al (see col. 61, lines 41-42).

Either of Suzuki et al or Chandross et al disclose the basic claimed method of forming a waveguide with a core, a cladding and an index contrast region situated therebetween, the primary references teaching depositing a polymerizable composite in a layer on a substrate, the composite containing a polymer binder and an uncured monomer/dopant moiety, patterning the layer to define an exposed area and an unexposed area, irradiating the exposed area to polymerize the polymerizable composite—ie, the monomer or dopant in the polymer binder—and volatilizing any uncured monomer in the unexposed area by baking, or heating. See Suzuki et al, col. 15, line 44 through col. 16, line 63, particularly lines 59-63 concerning the interfacial area between core and cladding; col. 10, lines 63-66 for the heating; see Chandross et al, col. 2, lines 35-62; col. 5, lines 41-45; Fig. 2C. Essentially, the primary references fail to teach that it is the core region of the waveguide that is unexposed and the explicit language of “index contrast region” and “diffusion source region” as set forth in instant claims 1 and 16. Concerning the former, Nishimura et al teaches forming a waveguide by patterning so that the clad is exposed and the core is left unexposed. In view of the methods disclosed in the references, one of ordinary skill in this art would realize that either—1) the core would be exposed—ie, polymerized— while the cladding portion is covered and not exposed, as taught in either primary reference or 2) the core would be unexposed—ie, not polymerized—while the cladding is exposed and polymerized, as

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taught in Nishimura et al. It would have been obvious for one of ordinary skill in the art at the time of invention to have modified the method of either primary reference by polymerizing the cladding —ie, leaving the core unexposed—dependent on the exact refractive index distribution desired for the waveguide. This would depend on the refractive index of the monomer, how it affects the refractive index of the core or cladding and the exact refractive index desired for the core and cladding, all parameters well within the skill level of the art.

Concerning the existence of an “index contrast region”, Suzuki et al teaches an interfacial area between the core and cladding as noted supra—see col. 16, lines 59-63. Chandross et al (Fig. 2D) shows the dopant molecules that haven’t been polymerized are attracted to the interface between the polymerized core area and unpolymerized cladding area, since diffusion naturally forces these moieties to flow to areas of lower concentration—ie, the interfacial area. It is respectfully submitted that the instant “index contrast region” is nothing more than the interfacial region between the core and cladding disclosed or depicted in the primary references. In other words, it is a natural consequence of the methods of the primary references to in fact produce what appellant is calling an “index contrast region”, which is simply a region where the refractive index changes from that of the core to that of the cladding.

Concerning instant claim 16 and a “diffusion source region”, appellant has merely recited that “one portion” of the unexposed area would comprise the core region and that “another portion” of the unexposed area would comprise the diffusion source region. It is respectfully submitted that whatever portion of the unexposed area that

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provides monomer or dopant molecules to the interface through diffusion would in fact constitute a “diffusion source region” as set forth in the instant claims. Whatever portion of the unexposed area that does not provide these molecules would constitute the ultimate core—or in the case of the primary references, cladding (remember, the primary references perform the masking and polymerization opposite to that of the instant claims) --region. However, it is quite clear that some portion of the unexposed area in either primary reference would inherently have to provide monomer or dopant molecules to the interfacial area between the core and cladding, and this portion would constitute the instant “diffusion source region”. Appellant has not argued any dependent claims separately and hence these will not be addressed at this juncture.

#### **(10) Response to Argument**

Appellant mentions the legal basis required for determining obviousness and it is respectfully submitted that such has been met in the instant application. For reasons already given, appellant’s comments with respect to Chandross et al not teaching diffusion or the formation of an index contrast region are simply not supported by what is shown in the reference and by what would naturally have to occur. For one thing, Chandross et al shows a greater concentration of the dopant molecules at the interface between the cured core and the uncured cladding—see Fig. 2D. This concentration increase is the natural result of diffusion as the dopant is polymerized and locked into the core region. Indeed, this diffusion is responsible for forming the “index contrast region”. Concerning Suzuki et al, the reference clearly teaches volatilizing by heating

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(see col. 8, lines 63-66) and a diffusion (ie, “osmosis phenomenon”) of the unreacted monomer into the interface between core and cladding –see col. 16, lines 59-63).

Hence, it is submitted that the reference does indeed teach volatilizing by baking and diffusing, contrary to comments at the bottom of page 4 of the brief. While there may be some differences between the polymers and monomers used in Nishimura et al and those used in the primary references, such is not seen to be germane to the rejection. Nishimura et al is merely being relied upon to teach which are of the waveguide is being exposed, not for the polymer/monomer systems or the exact manner in which the exposure is occurring. Appellant’s comments with respect to instant claim 16 and the “diffusion source region” have been essentially already addressed. While appellant argues –and discloses at paragraph 0060 of the instant specification—that one source of monomer diffusion is from the (unexposed) core and the other from an unexposed region adjacent to the cladding surrounding the core—ie, the diffusion source region—it is not seen how this differentiates from the combination as applied. As already noted in the rejection, whatever portion that is unexposed will of course provide monomer moieties and a certain portion of this can be termed a “diffusion source region” in the process of either primary reference. In essence, the “diffusion source region” is the area at the interface, and it is this area that predominantly provides for the monomers that are diffused and the formation of an “index contrast region”. Appellant’s comments at the first three lines of page 8 of the brief admit that in both Chandross et al and Suzuki et al, the monomers evaporate or diffuse “into the core region” --however, they primarily diffuse into the unpolymerized interfacial region, since the core has been



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polymerized and diffusion thereinto would be very slow. Indeed, by this comment, it would appear that appellant is acquiescing to the fact that these phenomenon are occurring in the methods of the primary references, something that appellant was unwilling to admit at page 4, paragraph 2 under heading 7A of the brief. Arguments directed to a control over the clad and the index contrast region are not probative, since this kind of control is not set forth in the claims. Further, the instant claims merely recite an index contrast region, not an “enhanced index contrast region”. Appellant appears to be arguing benefits of the instant invention when in fact the claim language is broad enough to be encompassed by the references as applied. The fact that neither primary reference teaches the exact terminology does not mean that it is not inherently there, or that the primary references are in fact not disclosing it. In truth, there is no difference between the instant claims and that shown in the primary references, except the aspect of which region is exposed. For reasons already noted, this would have been an obvious modification to the process of either primary reference when taken in combination with Nishimura et al.

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**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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